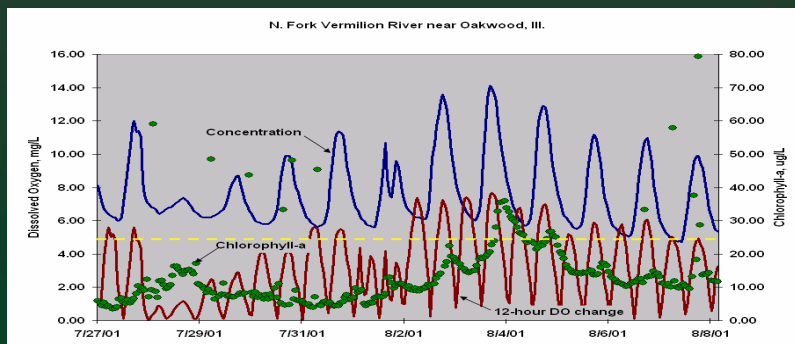



# Nutrient Standards for Illinois Surface Waters

## Working Hypothesis

### Cause-Effect Relationships



## Timeline

- Winter 2003** Illinois plan for nutrient standard development agreed to by USEPA
- 2003-07** Research, Monitoring, Data evaluation, Discussions
- Spring 2008** Prepare petition for nutrient standards for the IPCB
- Fall 2008** File IPCB petition
- Spring 2009** Prepare implementation rules for nutrient standards
- Fall 2009** IPCB adopts nutrient standards
-  1-year extension of original timeline

## 2008 Update

Research Final Results

Data Collection

Proceedings

Historical Data Analysis



# Research



## Council on Food and Agricultural Research (C-FAR)

2003-2007

- University of Illinois
- Illinois State University
- Illinois State Water Survey
- Illinois Natural History Survey

- *Effects of Phosphorus Mediated through Algal Biomass in Illinois Streams*
- *Spatial and Temporal Relationships among Nutrients, Dissolved Oxygen, and the Biotic Integrity of Illinois Streams*
- *Controls on Dissolved Reactive Phosphorus and Particulate Phosphorus in Illinois Streams*
- *Establishing the Causes and Thresholds of Nutrient Impairment in Agriculturally Intensive Illinois Watersheds*

<http://www.ilcfar.org/research/waterqualityforum.html>




**Topics**

- Overview
- External Competitive Grants Program
- Strategic Research Initiatives (SRIs)
- Research Calendar
- Research Focus Areas
- Research Portfolios
- Research Reports
- Research Partners


### 2007 Water Quality Nutrient Standards Forum

The Illinois Council on Food and Agricultural Research (C-FAR) sponsored an educational forum on the latest research in Illinois water quality on Tuesday, October 23 at the University of Illinois at Springfield. The forum focused on the impact of multiple factors affecting Illinois surface waters.

To better understand the role agriculture and other factors play in influencing the quality of Illinois' rivers, streams, and lakes, researchers from across the state have collaborated in a multidisciplinary, multi-institutional research effort funded by the State of Illinois via C-FAR. In 2003, C-FAR established its water quality strategic research initiative focused on improving the research base to aid in the State of Illinois' development of nutrient standards for the surface waters of Illinois.

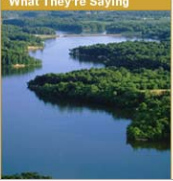


Water quality forum attendees



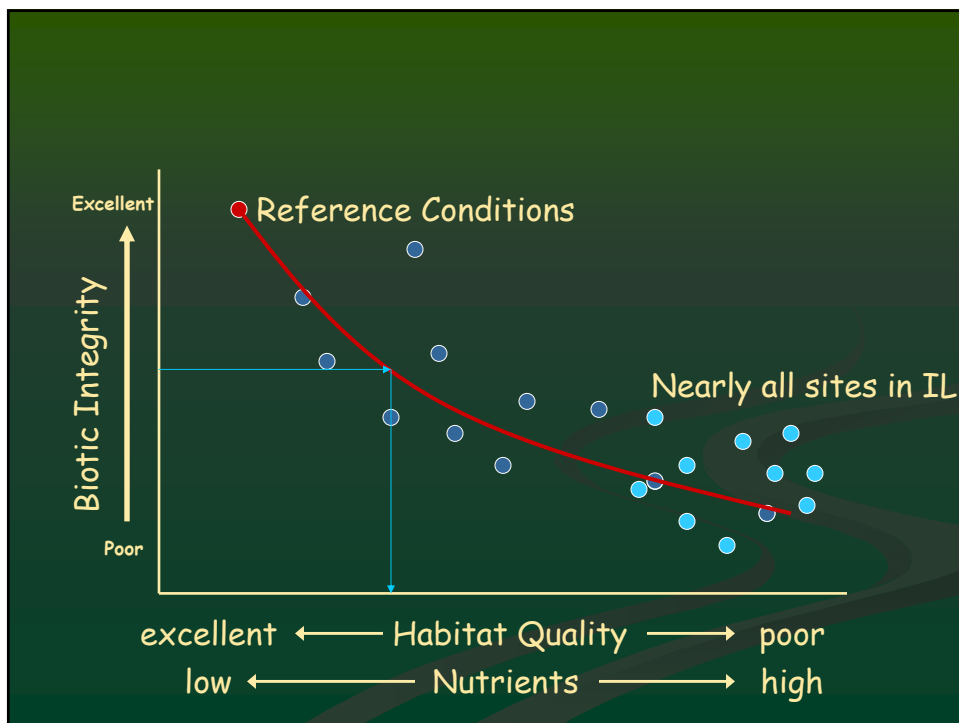
C-FAR Chairman Alan Puzey welcomes attendees

**What They're Saying**



# Summary

- Nutrients generally are not limiting algal biomass in Illinois streams.
  - Lack of defining conditions for limitation
- Light availability and substrate characteristics are at least as influential on algal and biological communities as nutrient concentrations.
- Relationships difficult to establish because Illinois lacks a wide range of conditions
- Physical habitat confounds defining relationships and is a primary limiting factor for algal growth and biological integrity.



## IEPA Monitoring (cont)

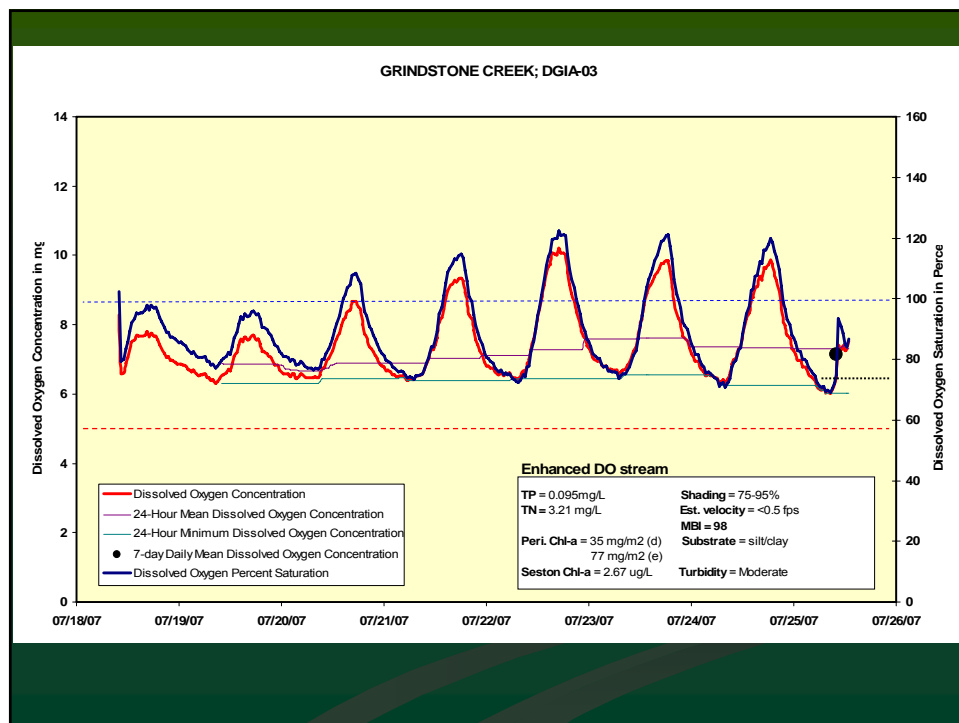
### Continuous Dissolved Oxygen Monitoring

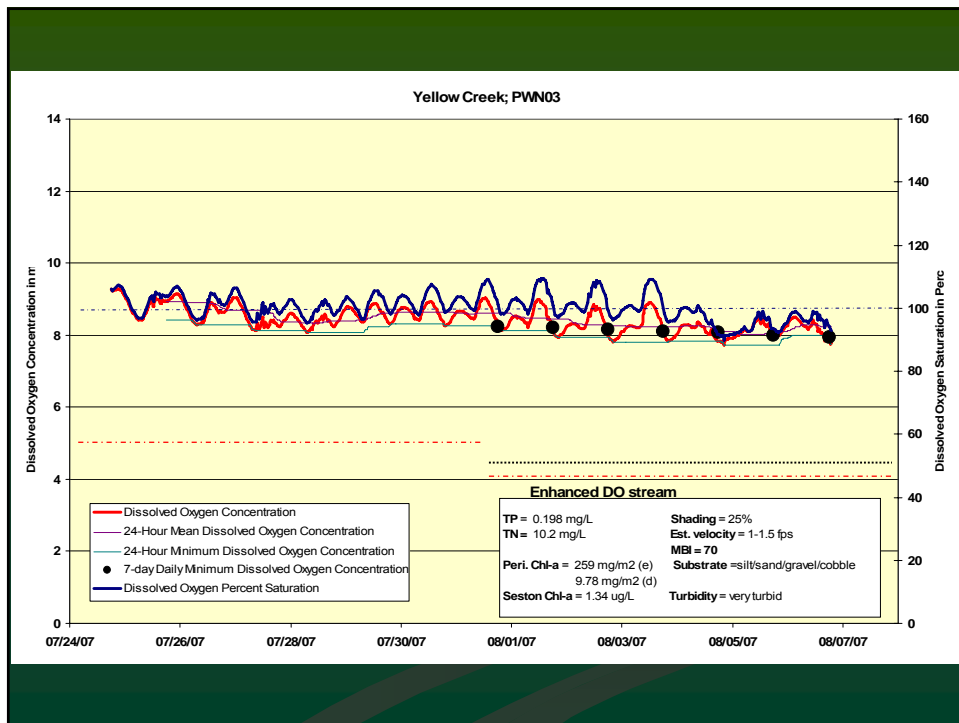
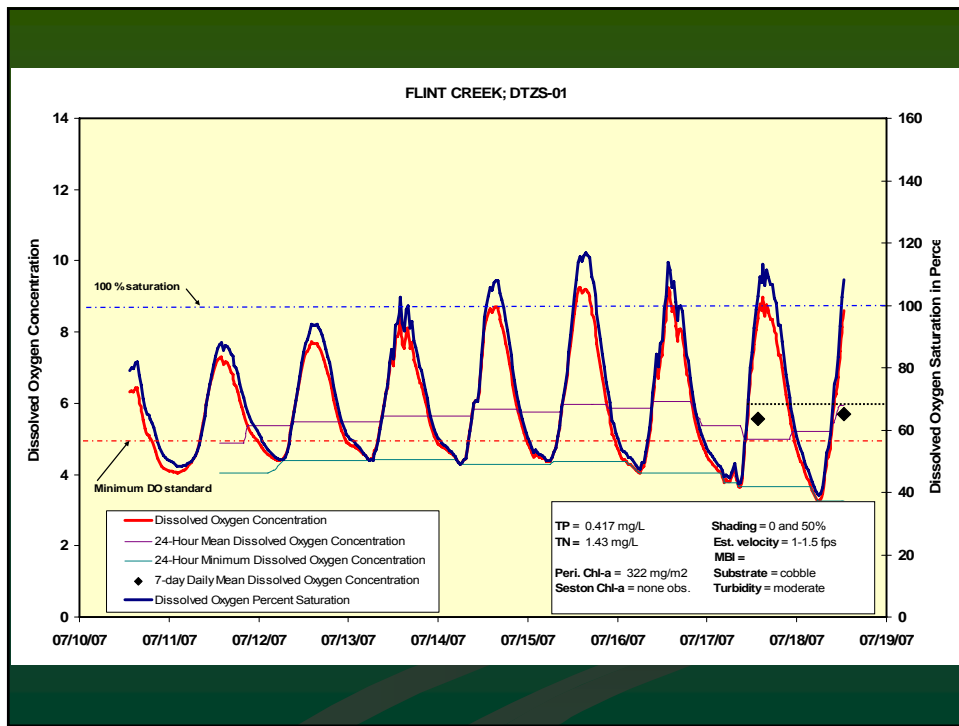
2001-03, 8 sites across the state with USGS

- Range of water-quality, latitude, land-use

### IEPA Intensive Basin Survey Sites

- 2004 - 15 sites (72-hour period)
- 2005 - 24 sites throughout Illinois (Riffle / Run / Pool)
- 2006 - 35 sites throughout Illinois - (two 7-day periods) → 9 Peri
- 2007 - 40 sites throughout Illinois - (two 7-day periods) → 35 Peri



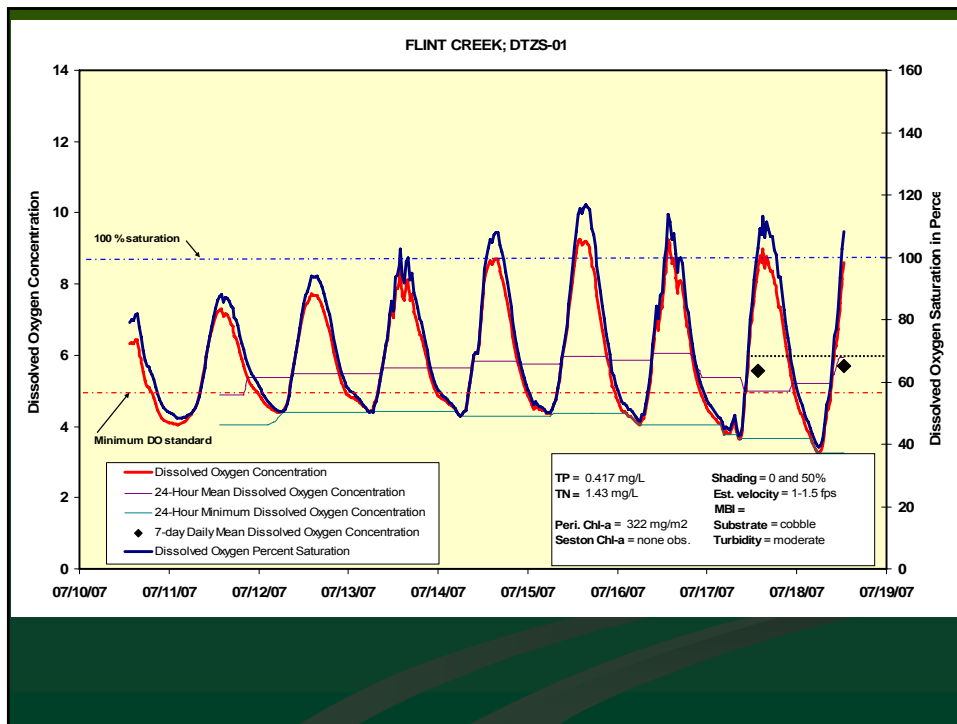


## Proceedings and Plans

- ✓ With the current understanding and knowledge of nutrient effects in Illinois streams, consideration of alternatives to strictly numeric criteria seems reasonable.
- ✓ Alternative scenarios drafted in regulatory language for consideration and argument by the Nutrient Standards Workgroup
  - 2 scenarios offered by Illinois EPA
  - 1 scenario offered by environmental advocacy groups
  - 1 position statement presented by the Illinois Association of Wastewater Agencies

## Scenario A - Dissolved Oxygen Basis

- If: Dissolved oxygen values are observed to exceed 100% saturation AND violate the minimum DO standard within the same 24-hour period,
- then a total P standard of (0.05) mg/L would be put in place for that stream segment and all segments upstream.
- ☞ This “DO signature” identifies a condition of over-enrichment of phosphorus
- A corresponding effluent permit limit would be implemented for certain dischargers
  - 303(d) listing / TMDLs
- Simple
  - Implements a standard only where there is a demonstrated need
  - Reactive



## Scenario B – Habitat Basis

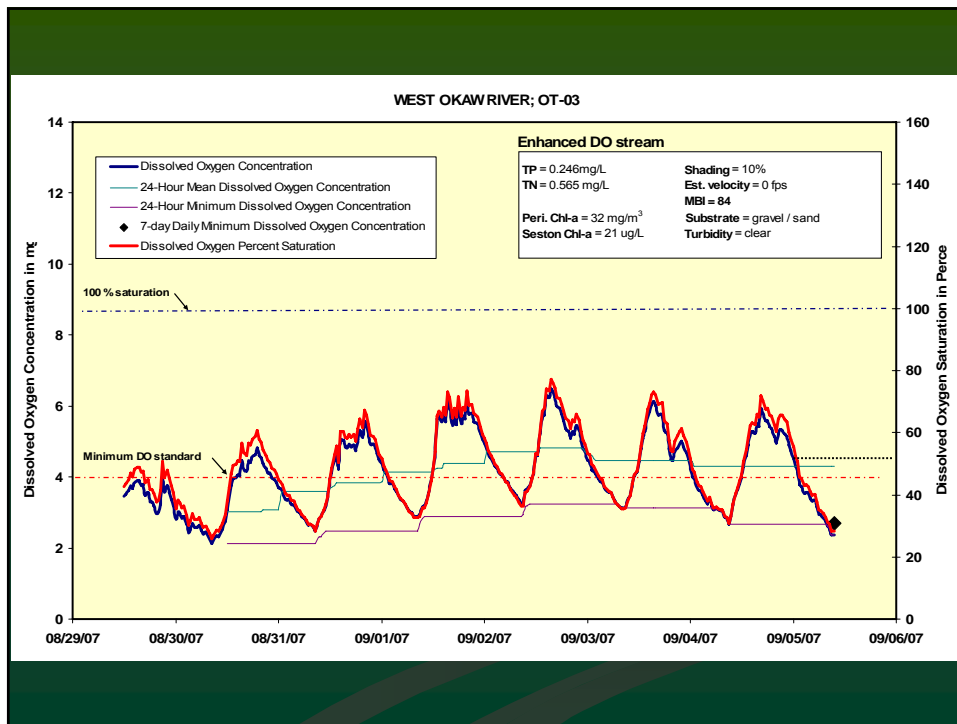
If

1. Canopy shading < 40 %, and
2. Turbidity < 30 NTU, and
3. Benthic Substrate >60% sand or larger, and
4. Flow duration analyses indicate absence of regular scouring or denuding flows,

then a total P standard of (0.05) mg/L would be put in place for that stream segment and all segments upstream.

- A corresponding effluent permit limit would be implemented for certain dischargers
- 303(d) listing / TMDL

- Information intensive, presumptive
- Implements a standard only where there is a likelihood of a problem
- Proactive



## Scenario C – Reference Basis

- Total Phosphorus shall not exceed 0.093 mg/L in any stream or river.
- High quality waters with P concentrations  $\leq$  the estimated reference P concentrations in the USEPA recommended criteria shall conform to those criteria
  - 0.052 mg/L Ecoregion VI
  - 0.031 mg/L Ecoregion IX
- Narrative nitrogen standard w/downstream waters clause
  - Simple
  - Protective

## Preliminary Implications

Scenario A – 3 streams (10%)

Scenario B – 5 to 8 streams (22-35%)

Scenario C – 22 (88%), w/ 3 close calls

- E. Central IL
- Upstream implications of A and B



## Historical Data Analysis

- 2003-2006 Chemistry, Biology, Habitat
- N-STEPS assistance